ACCESSION #: 9610240029

LICENSEE EVENT REPORT (LER)

FACILITY NAME: BIG ROCK POINT NUCLEAR PLANT PAGE: 1 OF 5

DOCKET NUMBER: 05000155

TITLE: Automatic Reactor Scram During Startup Due to High

Reactor Pressure

EVENT DATE: 09/16/96 LER #: 96-010-00 REPORT DATE: 10/15/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: Y POWER LEVEL: 56

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Michael D. Bourassa, Licensing TELEPHONE: (1-616) 547-8244

Supervisor

COMPONENT FAILURE DESCRIPTION:

CAUSE: B SYSTEM: SB COMPONENT: BBL MANUFACTURER: G080

REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED:

ABSTRACT:

On September 16, 1996, @ 0251, Big Rock Point experienced an automatic reactor scram due to high reactor pressure. All systems operated as expected. The unit was in the process of being returned to service following a short forced outage prompted by a packing leak on a Reactor Depressurization System isolation valve.

The initiator of this event has been attributed to the failure of the turbine Initial Pressure Regulator (IPR) bellows (the IPR maintains an essentially constant steam line pressure

without regard to the generator or the transmission line system load). A crack had developed in the bellows, causing a loss of steam pressure and resulting closure of the turbine admission valves, causing the reactor pressure to increase beyond the high pressure scram setpoint. The root cause of the bellows failure was determined to be a lack of fusion defect on an inside weld bead.

An IPR bellows with one operating cycle (about 12 months) of satisfactory performance has been installed in lieu of a new bellows, which would not be available for at least 10 weeks. The unit was then returned to service on September 17, 1996.

To prevent future bellows failures, deficiencies in the vendor's fabrication process will be evaluated and corrected.

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IDENTIFICATION OF EVENT

This event is reportable to the Nuclear Regulatory Commission pursuant

to:

1) 10 CFR 50.72(b)(2)(ii): Any event or condition that results in a

manual or automatic actuation that results in a manual or automatic

actuation of any Engineered Safety Feature (ESF), including the Reactor

Protection System.

2) 10 CFR 50.73(a)(2)(iv): Any event or condition that results in a

manual or automatic actuation that results in a manual or automatic

actuation of any Engineered Safety Feature (ESF), including the Reactor

Protection System.

REFERENCES

September 17, 1996, Letter to Nuclear Regulatory Commission:

Initial Pressure Regulator (IPR) Bellows Replacement Following September

16, 1996 Automatic Reactor Scram.

October 2, 1996, Letter to Consumers Power Company: Acknowledgement of the Initial Pressure Regulator Bellows Replacement Letter.

DESCRIPTION OF EVENT

On September 10, 1996 at approximately 0000, an operator on rounds inside containment discovered a packing leak on the "D" Reactor Depressurization System Isolation Valve CV-4183 [ISV]. Off-Normal Procedure 2.39, Loss of Reactor Coolant - Minor, was entered at 0020, and all immediate actions were taken. At 0230, Technical Specification 11.3.1.5 7 day Limiting Condition of Operation was entered. Repairmen attempted to stop the packing leak, but were unsuccessful.

Note: The primary system [AD] leakage was not in excess of technical specification limits. Estimated primary system leakrates during this period ranged from .355 to .395 gpm unidentified. The required daily leakrate was logged as .475 gpm.

Since the degraded component could not be repaired with the plant in operation, management decided to resolve the condition by initiating an orderly shutdown of the facility at 0403. An informational emergency notification report was made on September 10, 1996 at 0930 to the NRC Operations Center with regard to the plant shutdown. The reactor [RCT] reached the cold shutdown condition on September 11, 1996 at 0505.

On September 14, 1996, @ 1853, the reactor was returned to service following repairs to CV-4183. By September 16, 1996, the unit was operating at about 56% power on one feedwater pump, when @ 0251 the reactor scrammed. The operators suspected that the scram was due to high reactor pressure (50 psig plus nominal ((1335 psig)) because the primary system pressure gauge was observed to be increasing just prior to the scram. All control rods

[ROD] fully inserted. Feedwater [SJ] controls operated properly and the turbine bypass valve [TRB;PCV] opened and controlled reactor pressure as designed. Other than the Reactor Protection System [JE], no other Engineered Safeguards Features were actuated. Primary system cooldown for the first hour was limited to 50 degrees F; and maintained below 100 degress F after that.

PREVIOUS OCCURRENCES

In the last 21 years, there have been five IPR bellows failures:

1. The first failure occurred October 31, 1975. The bellows were in service for 11 days. The root cause was determined to be a weld failure in the bellows.

2. The second failure occurred August 11, 1976. The bellows were in service for 11 months.

3. The third failure occurred August 22, 1989, The bellows were in service for two weeks. A pinhole leak in the bellows was caused by intergranular stress corrosion cracking (IGSCC). Corrective action included pressure testing the bellows at each refueling outage, and requiring the vendor to hydro test the IPR bellows with

demineralized water versus tap water.

4. The fourth failure occurred June 3, 1992. The bellows were inservice for two years. The failure was due to a lack of fusion in a weld (65% through wall propagation) which accelerated the cyclic fatigue failure process. Corrective action included changing the bellows each refueling outage.

5. The fifth failure is the subject of this LER. This bellows was installed during the 1996 refueling outage and had a service life of 157 days.

ROOT CAUSE

The root cause of the reactor scram has been attributed to the failure of the IPR bellows [BLL]. A crack in the bellows resulted from fabrication problems with an inside weld bead. The failed inside weld bead exhibited a large lack of fusion defect. Additionally, the inside bead was not a full bead which resulted in a root notch. The root notch plus the lack of fusion defect (effectively 70% of cross sectional area) acted as an initiation site for high cycle fatigue cracking. The high cycle, low amplitude stresses generated by the bellows during pressure fluctuations were the source of the fatigue loading on the weld root.

CORRECTIVE ACTION

The IPR bellows has failed in the past; and most recently was addressed in Licensee Event Report (LER) 92-010 dated July 2, 1992. Corrective action associated with LER 92-010 concluded that replacement of the bellows and implementing an "IPR bellows monitoring plan to detect leakage while the plant is operating as a means of precluding similar reactor scrams" was required for continued plant operation.

On November 17, 1993, Consumers Power Company forwarded a letter to the Commission to inform them that the IPR monitoring program installed during the previous operating cycle would be discontinued. Plans were made to replace the bellows every refueling outage with a new, certified, radiographed bellows. The bellows would also be tested in accordance with maintenance work instructions using a new test fixture, lending a greater degree of confidence that the bellows would perform their intended function without premature failure.

Following the September 16, 1996, scram, an IPR Bellows with about 12 months (one operating cycle) of satisfactory performance was installed in lieu of a new bellows. The Staff was informed of this action in a September 17, 1996, letter. The Nuclear Regulatory Commission responded in a letter forwarded October 2, 1996, and concluded that the replacement of the IPR bellows with one operating cycle was acceptable for operation until the 1997 Refueling outage. Additional justification would need to be provided to the Staff for use beyond the 1997 refueling outage.

The IPR bellows has also been classified A(1) per the Maintenance Rule, 10 CFR 50.65, with an improved bellows replacement and a period of satisfactory performance necessary for return to A(2).

The Big Rock Point staff will also work with General Electric [G080], the vendor of the IPR, to correct fabrication deficiencies prior to the fabrication of future replacement bellows.

SAFETY SIGNIFICANCE

The plant response to the IPR failure consisted of the automatic and manual actions required to satisfy the critical safety functions necessary to achieve a stable shutdown condition, limiting the safety significance of this event. When the IPR failed and the turbine admission valve began to close, an immediate local rise in pressure at the valve was rapidly communicated to the reactor vessel [RPV]. The sudden pressure rise in the reactor vessel generated a high pressure reactor trip. With the reactor trip, the control rods inserted, and power rapidly decreased to decay heat levels. In conjunction with the continued addition of feedwater, which temporarily caused a decrease in reactor vessel coolant temperature, primary pressure decreased and the turbine bypass valve, which opened to control pressure, reclosed. The feedwater pump [SJ;P] continued to operate, maintaining

steam drum [SD] level at centerline. Primary system pressure control was provided by decay heat removal to the main condenser [COND].

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Consumers

Power Patrick M Donnelly

Plant Manager

POWERING

MICHIGAN'S PROGRESS

Big Rock Point Nuclear Plant, 10269 US-31 North,

Charlevoix, MI 49720

October 15, 1996

Nuclear Regulatory Commission

Document Control Desk

Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT - LICENSEE EVENT

REPORT 96-010:

Licensee Event Report 96-010: AUTOMATIC REACTOR SCRAM DURING PLANT

STARTUP DUE TO HIGH REACTOR PRESSURE is attached. This event is

reportable to the Nuclear Regulatory Commission in accordance with 10 CFR

50.73(a)(2)(iv) - Actuation of an Engineered Safety Feature or the

Reactor Protection System.

Patrick M Donnelly

Plant Manager

CC: Administrator, Region III, USNRC

NRC Resident Inspector - Big Rock Point

ATTACHMENT

A CMS ENERGY COMPANY

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